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PATENT SPECIFICATION

727,195

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COMPLETE SPECIFICATION

Improvements in or relating to Pyrophoric Liquefied Gas Lighters

We, LE NITROGÈNE S.A., a Company organised under the Laws of Switzerland, of 2, rue des Fabriques, Geneva, Switzerland, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement :—

There are already known in pyrophoric lighters utilising liquefied gas, burners formed by the free end of a fuel supply tube mounted at its lower end in the fuel storage chamber or container of the lighter and provided, in proximity to this lower end, with a portion of reduced cross-sectional area, obtained by a flattening of the tube. When the free end of the tube is adjusted by bending about its reduced section, from its normal position, the cross-sectional passage area of the flattened portion is increased or reduced and it is thus possible to regulate the quantity of fuel reaching the burner, and consequently the size of the flame. The adjustment of the free end of the tube is effected, for example, by means of a screw, the end of which is in contact with the tube.

In connection with liquefied gas lighters there are also known fuel supply tubes for the burner, provided, between the burner thereof mounted to the body of the lighter and the free end thereof, with a curved portion of reduced cross-sectional area. In this case the adjustment of the passage for the fuel between a maximum condition and a minimum condition, is effected by acting axially on the free end of the tube.

In devices of the type above referred to, an instability of the flame has been observed which is due to the fact that the passage of reduced cross-sectional area allows liquefied gas to pass which vaporises between this part and the point of combustion. If the heat, produced by combustion on the end of the tube, is transmitted to the portion of the tube of reduced cross-sectional area, vaporisation already takes place between the fuel storage chamber and the portion of tube of adjustable cross-sectional area, whereby a very considerable distinction of the flame is produced. In order to obtain a stability of the flame, it is necessary to provide, between the portion of tube of adjustable cross-sectional area and the point of combustion, a device preventing the heat derived from the burner from being transmitted completely to the part of adjustable cross-sectional area.

According to the present invention a liquefied gas pyrophoric lighter having a fuel-supply tube connected at one end to the fuel storage chamber of the lighter, and the other end being free and constituting the burner, with a portion of reduced cross-sectional area variable under the action of a control member adjustable in position, is characterised in that a thermal resistance is located between the point of combustion of the gas and the portion of the fuel supply tube of reduced cross-sectional area, said resistance being constituted in such a manner that the heat transmitted to the latter is at most equal to the heat of vaporisation of the gas consumed.

Two forms of construction embodying the invention are shown by way of example in the accompanying drawings, wherein :

Fig. 1 is a sectional view of a first form of construction ;

Fig. 2 is a view of a detail in Fig. 1 to a larger scale ;

Fig. 3 is a partial view of a second form of construction.

With reference to Fig. 1, the body of the pyrophoric lighter is indicated by 1 and the fuel storage chamber by 2. In the upper part of the body of the lighter, the chamber is narrower and leaves a space 3, in which is located the fuel supply tube 4. The lower part of the latter is secured to a fixing tube 5 passing completely through the lower part of the chamber 2 and leading to the outer face of the body 1 of the lighter. The lower end of tube 5 has an enlargement 6 provided with an axial recess forming a diameter substantially larger than the external diameter of the tube 4. The central part of the recess is connected to the base of the chamber by a passage 7. The lower end of the tube 4 is secured to the tube 5 by means of two washers 8 of flexible and resilient material, for example of rubber, of the same diameter as that of the recess of the part 6 and between which is located a metal ring 9 provided with an annular groove on its outer face (Fig. 2) to form a clearance between the ring and the cylindrical wall of the recess. The internal opening in the ring 9 is larger than the diameter of the tube 4, so that a clearance is formed between these two parts. The ring is also provided with radial perforations 10 and the tube 4 with a radial perforation 11. A tightening screw 12, located in the end of the tube 5, serves to compress the two washers 8 which bear against the walls of the recess in the enlarged end of the tube 5 and against the tube 4, changing the latter and maintaining it in position. The arrangement is such that the ring 9 has its groove opposite the passage 7 leading into the chamber and also opposite the perforation 11 of the tube 4.

It will thus be seen that communication is established between the chamber 2 and the tube 4, whilst ensuring, on the one hand, an effective fluid-tightness towards the outside and, on the other hand, permitting of easy removal of the fuel supply tube 4.

In proximity to the upper end of the tube 4, the tube 4 has a portion 13 of reduced cross-sectional area. This portion is flattened and curved, and serves as the bending point for adjusting the cross-sectional area and fuel supply. It will be appreciated that by bending the tube laterally about this point, thus increasing or reducing the curvature, the cross-sectional passage area of the interior of the tube is reduced or increased.

As shown in the drawing, the end of the fuel supply tube carries a nozzle 14 and is extended by a sleeve 15, in which is located, with clearance, a small burner nozzle tube 16. The latter has an upper end 17 of reduced diameter which projects from the sleeve 15 of which the upper edges are bent slightly towards against the reduced portion 17 so as to prevent the tube 16 from passing out, whilst allowing it to slide freely.

The tube 16 has a radial opening 18 leading into the annular space 19 located between the tube 16 and the sleeve 15.

Between the bottom of the tube 16 and the nozzle 14 is located a closure member 20, for example of rubber, of the same diameter as the tube 16.

The sleeve 15 is in engagement, on the one hand, with a control member, adjustable in position, formed by a sleeve 21 actuated by a screw 22 and, on the other hand, with a spring 23.

On the body 1 of the lighter is hinged a cover 24 having a step 25 which, in the closed position of the cover, comes to bear against the end 17 of the tube 16 and closes the nozzle 14 by means of the member 20.

In this form of construction the space 19 obtaining between the tube 16 and the sleeve 15 constitutes a thermal resistance which opposes the transmission of heat, developed by the flame at the end of the tube 16, to the fuel supply tube 4. The thermal resistance is so established that the heat transmitted to the portion of reduced cross-sectional area is at the most equal to the heat of vaporisation of the gas consumed.

In the form of construction shown in Fig. 3, the thermal resistance, located between the part 13 of reduced cross-sectional area of fuel supply tube 4 and the point of combustion, is formed by a small diameter tube 26, with thin walls, and a weld by which the tube 26 is welded to the end of the tube 4.

For this purpose the walls of the tube 26 are extremely thin, whilst the weld constitutes a brake to the passage of heat, so that the heat transmitted to the tube 4 is at the most equal to the heat of vaporisation of the gas consumed.

In this form of construction the step 25 of the cover is replaced by a piece of pliant and resilient material, for example of rubber, which closes the end of the tube 26 in the closed position of the cover.

The examples described relate to a fuel supply tube having a portion of reduced cross-sectional area obtained by a flattening and a bend, in which the variations are obtained by adjusting the bend of the tube.

It will be understood that it is also possible to provide a fuel supply tube having at least one portion of reduced cross-sectional area obtained simply by bending the tube, in which case the variations of this cross-sectional area are obtained by acting axially on the free end of the tube, for example, by means of a nut.

What we claim is :—

1. A pyrophoric liquefied gas lighter having a fuel supply tube connected at one end to the fuel storage chamber of the lighter, the other end being free and constituting the burner, with a portion of reduced cross-sectional area variable under the action of a control member adjustable in position, characterised in that a thermal resistance is located between the point of combustion of the gas and the portion of the fuel supply tube of reduced cross-sectional area, said resistance being constituted in such a manner that the heat transmitted to the latter is at most equal to the heat of vaporisation of the gas consumed.

2. A lighter according to Claim 1, characterised in that the portion of the fuel supply tube of reduced cross-sectional area is produced by flattening and bending the tube over a portion of its length in proximity to its point of connection to the chamber.

3. A lighter according to Claims 1 and 2, characterised in that the thermal resistance is formed by a burner nozzle tube with thin walls, mounted on but spaced from the free end of the fuel supply tube, the external diameter of the nozzle tube being smaller than that of the fuel supply tube on which it is mounted.

4. A lighter according to Claims 1 and 2, characterised in that the thermal resistance is constituted by an annular space formed between a burner nozzle tube spaced from the free end of the fuel supply tube and a surrounding extension of the free end of the fuel supply tube.

5. A lighter according to Claim 4, characterised in that the annular space is formed by a smaller diameter burner nozzle tube projecting from and supported in the end of an extension sleeve of the fuel supply tube so as to leave a clearance between the outer face of the nozzle and the inner wall of the said sleeve.

6. A lighter according to Claim 4, characterised in that opposite the inner end of the nozzle tube is located a member of pliant and resilient material, adapted to come into fluid-tight engagement with the supply tube opening under the action of the nozzle tube sliding in a sleeve extension on the end of the fuel supply tube when closing the cover of the lighter.

7. A lighter according to Claim 1, characterised in that the lower end of the fuel supply tube is engaged, in proximity to the bottom of the lighter, in a cylindrical recess of larger diameter than the tube, the latter being retained in position by axial compression of at least one resilient member between the walls of the recess and the tube.

8. A lighter according to Claims 1 and 7, characterised in that the recess contains two rings of resilient material subject to the compressing action of a screw, a metal washer being located on the tube between the two rings with clearance between the cylindrical walls of the recess and tube and having at least one radial opening, said washer being located opposite a passage from said recess into the fuel storage chamber and opposite at least one radial hole in the fuel supply tube.

9. Pyrophoric liquefied gas lighters substantially as hereinbefore described and as shown in the accompanying drawings.

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93-94, Chancery Lane, London, W.C.2.

Reference has been directed in pursuance of Section 9, subsection (1) of the aforesaid Act, 1949, to Patent No. 679,822.

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1 SHEET
This drawing is a reproduction of the Original on a reduced scale.

Fig. 1

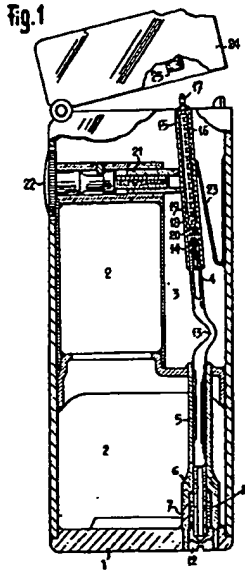

Fig. 3
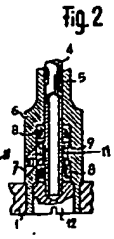
Fig. 2